LOOSE LAID VENTILATING DECORATIVE FLOOR COVERING

The present invention provides a method for the installation of loose laid safety flooring providing the ventilation of newly laid concrete floors and a ventilating floor covering suitable for contaminated and/or uneven sub-floors.

Recently, there has been growing pressure in the construction industry for newly-built and refurbished buildings to be ready for use in shorter periods of time. With new construction methods, it is now possible to construct a new building in a relatively short period of time compared to a few years ago. The time it takes for the concrete used in the construction of the building to cure has now been found to be a limiting factor. The problem is that if a building is furnished before the concrete is cured, the water vapour produced by the concrete in curing causes damp in the building, damaging the furnishings. Another problem experienced by flooring contractors is that of contaminated surfaces, this is a problem more common in refurbished buildings but may occur in new builds also. Contaminants such as oils, minor cracks etc will reduce the effectiveness of adhesives, and can also require expensive preparations of the sub floor before a floor covering is laid.

A way of ameliorating these problems has been sought.

According to the invention, there is provided a method of laying a slip resistant floor covering to decorate and ventilate a concrete floor having an upper surface which method includes loose laying on the upper surface of the floor a floor covering having a decorative slip resistant upper surface and a lower surface on which are formed a plurality of studs and/or other suitable profiles which provide an air gap between the lower surface of the floor covering and the upper surface of the floor sufficient

to ventilate the floor. The invention is manufactured to ensure a dimensionally stable floor covering with no curling, shrinkage etc.

According to the invention, there is also provided a ventilating decorative floor covering for loose laying on the upper surface of a floor which floor covering has a decorative upper surface and a lower surface on which are formed one or more studs which, in use, provide an air gap between the lower surface of the floor covering and the upper surface of the floor sufficient to ventilate the floor.

One advantage of the method of the invention is that by not adhering the floor covering to a substantial portion of the floor and by providing studs on the lower surface of the floor covering, ventilation of the upper surface of the floor is possible such that water vapour produced by the concrete floor during its curing can escape. Thus, the method of the invention can be applied to concrete floors which have not completely cured. The invention also allows the floor covering to be laid on contaminated sub-floors, thus negating the need for timely and expensive sub-floor preparation. As a result, there is less delay between the end of construction of a building and the fitting out of its interior for use by its occupants. The reduction of this delay results in considerable cost savings and increased convenience for both the constructor of the building and its future occupants alike. The invention allows the floor covering to be laid without a primer, adhesive and/or screed, which is an advantage to the environment and minimise any health and safety issues in confined spaces. The lack of adhesive also improves recycling possibilities due to the lack of any residues and allows the floor covering to be easily removed, and the ability to be used as a temporary floor covering.

A stud formed on the lower surface of the floor covering may be of any shape or dimension and present in any number per unit area of the floor

covering suitable to ventilate the floor to which the floor covering is to be applied. A stud is optionally in the form of a projecting portion of the lower surface or a profile formed by the lower surface. The floor covering is generally not adhered to the floor to which it is applied in order that the upper surface of the floor is not sealed. This allows water vapour to escape from the upper surface of the floor.

Preferably the floor covering will be a heterogenous plastics floor covering made up from a plurality of layers which preferably include a wear layer. The wear layer may be in the form of a coating, for example as described in WO 00/42274, the contents of which are incorporated by reference.

The lower surface of the floor covering is preferably chemically or mechanically modified to ensure that there is adequate grip between the lower surface of the floor covering and the floor to which it is applied. Optionally the modification is in the form of a softening and/or a roughening of the lower surface. One way in which the lower surface could be roughened is by including a blowing agent in the plastics material from which the lower surface of the floor covering is preferably formed. A suitable blowing agent for this purpose is a gas filled microsphere such as that marketed under the name Expancel by Akzo Nobel. The blowing agent is preferably included in a sufficient amount to roughen the lower surface of the floor covering. To soften the lower surface of the floor covering, the lower surface could include additional plasticiser or a chemical blowing agent such as an azodicarbonamide.

Preferably the floor covering includes one or more particulate materials to provide slip resistance. A particulate material is preferably embedded in the upper surface of the flooring material which material is at least partially proud from the upper surface to achieve adequate slip resistance.

A particulate material is optionally dispersed within the floor covering to improve the non-slip properties further and/or to enhance the wear resistance of the floor covering.

The floor covering is preferably a plastics flooring material. More preferably the floor covering includes a plastics material which is a PVC, a plasticised PVC, a polyurethane, an epoxy resin, an acrylic, a plasticised acrylic, a polyurefin, a polyester, and/or other suitable thermoplastics. The preferred floor covering includes a plastics material such as a PVC plastisol.

The upper surface of the floor covering may optionally contain decorative elements such as a pigment and/or a PVC chip and any other suitable decorative finish. The floor covering preferably includes a support, more preferably a reinforcing support.

The plastics material used to form the floor covering according to the invention preferably contains and/or is formed from a plastics material as defined above preferably in an amount of 100 to 200 php, a blowing agent (e.g. an azodicarbonamide or a gas filled microsphere such as that marketed under the name Expancel by Akzo Nobel) preferably in an amount from 0 to 2 parts per hundred parts of plastics material (php), filler (e.g. calcium carbonate, magnesium carbonate, talc etc) preferably in an amount of from 0 to 100 php, thermal stabiliser (e.g. an organometal soap stabiliser) preferably in an amount of from 1 to 3 php, pigment (e.g. titanium dioxide suspended in a compatible plasticiser from above) preferably in an amount of from 1 to 3 php. Other additives such as a rheology modifier, biocide, and/or a UV stabiliser may also be used.

The floor covering could be produced in a number of ways i.e. wet coating, calendaring and/or any other suitable production method. The

floor covering may be made up of one or more layers of plastics material; preferably up to three layers are envisaged the manufacturing process may occur in stages to produce a single sheet floor covering.

The particulate material is preferably a grit; more preferably it is one or more of a number of types of hard particles including silicon carbide, a silica (e.g. quartz, a coloured or natural sand or a flint), aluminium oxide, emery and/or any other suitable material.

The floor covering may optionally further contain quartz, decorative chips or any other decorative additives to add a decorative effect. The floor covering may be embossed to enhance the decorative finish.

The invention is illustrated by a way of example with reference to the following drawings in which:-

Figure 1 shows a cross-sectional view of a floor covering according to the invention; and

Figure 2 shows a schematic view of a production line for use in the manufacture of a floor covering according to the invention by a wet coating process.

The floor covering 1 shown in the figure has an upper layer 5 having a decorative surface with surface particulates to improve slip resistance 10, a scrim layer 25 and a lower layer 15 having a surface which is provided with studs or profiles 15. In use, the floor covering is placed on a floor such that the lower surface of the floor covering 1 engages an upper surface of the floor. The studs or profiles 15 allow the movement of air between the lower surface 10 of the floor covering and the upper surface

of the floor. This allows ventilation of the floor which is important if the floor is of concrete which has not cured completely.

With reference to Figure 2, a production line indicated at 30 starts at the point indicated at 31 where a non-woven support is unwound onto an inert carrier belt. A base coat is applied at 32 which is then heated in oven 34. The surface of the base coat is melted by infra red heaters 36 before it is embossed at 38. The base coated support is then cooled and inverted such that its lower surface faces upwards at 40 before being subject to a top-coating process where a top coat is applied at 42 and aggregate material is scattered onto the top coat at 44. The top coat is then heated in oven 46. The surface of the top coat is melted by infra red heaters 48 before being embossed at 50. The product is then cooled, cut to length and then wound at 52.

The preparation of a plastics floor covering according to the invention is illustrated in the following example:

EXAMPLE 1

A plastisol having the formulation given in Table 1 was prepared as described below:

TABLE 1

Ingredients	Weight/kg
Solvic 266F	10 (100 parts)
Jayflex DIDP	5 (50 php)
Microdol H155	6.5 (65 php)
BZ505	0.2 (2 php)
Blue BLP pigment	0.2 (2 php)

Wherein Solvic 266SF is a PVC polymer manufactured by Solvay; Jayflex DIDP is a di-isodecyl phthalate plasticiser manufactured by Exxon; Microdol H155 is a calcium magnesium carbonate manufactured by Omya; BZ505 is a liquid barium zinc preparation containing organic barium compounds and phosphite manufactured by Witco; Blue BLP pigment is a phthalocyanine blue pigment manufactured by Ciba Pigments.

The ingredients were weighed in to a 50 litre steel vessel and mixed by a suitable mixer using a trifoil shaft at 100 rpm for 4 minutes and a dissolver shaft at 1800 rpm for 2 minutes. Aluminium oxide particles (from Washington Mills) size F40 (FEPA Standard 42-GB-1984 measurement) were weighed into each plastisol (10% w/w) and mixed.

The plastisol thus produced was used to make a floor covering according to the invention. It was spread coated at 1mm by knife over roller onto a non-woven support, and then fused at 185°C for 3 minutes and embossed with the stud pattern. The PVC sheet was then reversed and cooled, a second coating of the plastisol was then spread coated at 1mm onto the non-embossed surface. Particles of silicon carbide (F36 FEPA-Standard 42-GB-1984), coloured quartz (nominally 0.7-1.2mm) and plasticised pigmented PVC particles (nominally 2.5mm) were scattered onto the surface at an approximate rate of $100gm^{-2}$, using standard equipment known within the industry. The product was then fused at 175°C for 3 minutes and was embossed with a sufficient enough nip-gap (i.e. space between emboss rollers which determines the pressure applied) to apply the required surface finish, but without destroying the stud pattern on the reverse. This was achieved by the use of IR lamps to heat and soften the surface enough to allow a light pressure emboss to apply enough force to impress a pattern on the surface. The material was then cooled and wound onto a core.